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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,823	11/13/2003	Kazuo Kasue	36856.1145	8283
7590 03/21/2005			EXAMINER	
Keating & Bennett LLP Suite 312 10400 Eaton Place Fairfax, VA 22030			ZARNEKE, DAVID A	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/705,823

**Applicant(s)**

KASUE ET AL.

**Examiner**

David A. Zameke

**Art Unit**

2829



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/13/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/13/03</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, and 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Morimoto, JP 08-241900.

Morimoto (figures 1a-d) teaches a method for fabricating a circuit module comprising the steps of:

supplying a resin [6] from a dispenser needle [5] onto a substrate [3] on which a chip component [1] is mounted in a flip chip configuration so as to form a resin pool [6] between a sidewall of the chip component and a sidewall of the dispenser needle; and filling a gap between the chip component and the substrate with the resin of the resin pool (figures 1c & d).

Regarding claim 2, Morimoto teaches the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin (figures 1b & c).

With respect to claim 5, Morimoto teaches the chip component is a bare chip.

Claims 11, 12, and 15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Morimoto, JP 08-241900.

Morimoto (figures 1a-d) teaches a method for fabricating a circuit module comprising the steps of:

placing a substrate [3] on a pedestal [7] having a built-in heat source to heat the substrate, the substrate including a chip component [1] that is mounted thereon in a flip chip configuration;

supplying a resin [6] onto the substrate by a dispenser needle [5] to form a resin pool [6] between a sidewall of the chip component and a sidewall of the dispenser needle; and

filling a gap between the chip component and the substrate with the resin of the resin pool (figures 1c & d).

Regarding claim 12, Morimoto teaches the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin (figures 1b & c).

With respect to claim 15, Morimoto teaches the chip component is a bare chip.

Claims 1, 2, 5 and 7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Wille, US Patent 5,821,456.

Art Unit: 2829

Wille (figures 1-2) teaches a method for fabricating a circuit module comprising the steps of:

supplying a resin [26] from a dispenser needle (4, 37+) onto a substrate [12] on which a chip component [14] is mounted in a flip chip configuration so as to form a resin pool [26] between a sidewall of the chip component and a sidewall of the dispenser needle; and

filling a gap between the chip component and the substrate with the resin of the resin pool (figures 1-2).

Regarding claim 2, while Wille fails to explicitly teach the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin, Wille implicitly teaches this because the resin of figure 1 is outside the gap after deposition, therefore the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin is inherently met by Wille.

With respect to claim 5, Wille teaches the chip component is a bare chip (2, 18+).

As to claim 7, Wille teaches the resin is an epoxy resin (2, 54+).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, and 6-10 and 14, 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto, JP 08-241900, as applied to claims 1 and 11 above, respectively.

Regarding claims 4 and 14, while Morimoto fails to teach, in forming the resin pool, the distance between the sidewall of the chip component and the sidewall of the dispenser needle is less than about 0.15 mm, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

With respect to claims 6 and 16, while Morimoto fails to teach the circuit module includes a radio frequency circuit, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a radio frequency circuit because radio frequency circuits are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

As to claims 7 and 17, while Morimoto teaches a resin, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an epoxy as the resin because epoxies are conventional resins used in underfilling. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

As to claims 8 and 18, while Morimoto fails to teach the sidewall of the dispenser needle is coated with a water repellant material, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to coat the needle with a water repellant because water repellant coated needles are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

In re claims 9 and 19, while Morimoto fails to teach, in forming the resin pool, the distance between a tip of the dispenser needle and a top surface of the substrate is about 50 um, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

Regarding claims 10 and 20, while Morimoto fails to teach, in forming the resin pool, the distance between a bottom surface of the chip component and a top surface of the substrate is about 40 um, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

Claims 3, 4, 6, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wille, US Patent 5,821,456, as applied to claim 1 above.

In re claim 3, while Wille fails to teach in the step of filling the gap between the chip component and the substrate with the resin of the resin pool, the dispenser needle is fixed at a position until the gap is filled with the resin constituting the resin pool, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to fix the dispenser until after the gap is filled because this is conventionally known in the art, as evinced by US Patents 6,498,0542; 6,610,559 (figure 1); 6,724,091 (figure 1C); 5,766,982 (figures 1 & 2); 6,391,683; 6,475,828. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).



Regarding claim 4, while Wille fails to teach, in forming the resin pool, the distance between the sidewall of the chip component and the sidewall of the dispenser needle is less than about 0.15 mm, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

With respect to claim 6, while Wille fails to teach the circuit module includes a radio frequency circuit, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a radio frequency circuit because radio frequency circuits are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

As to claim 8, while Wille fails to teach the sidewall of the dispenser needle is coated with a water repellant material, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to coat the needle with a water repellant because water repellant coated needles are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

In re claim 9, while Wille fails to teach, in forming the resin pool, the distance between a tip of the dispenser needle and a top surface of the substrate is about 50  $\mu\text{m}$ , barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

Regarding claim 10, while Wille fails to teach, in forming the resin pool, the distance between a bottom surface of the chip component and a top surface of the substrate is about 40 um, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wille, US Patent 5,821,456, as applied to claim 1 above, and further in view of Morimoto, JP 08-241900.

Wille (figures 1a-d) teaches a method for fabricating a circuit module comprising the steps of:

providing a substrate [3] including a chip component [1] that is mounted thereon in a flip chip configuration;

supplying a resin [6] onto the substrate by a dispenser needle [5] to form a resin pool between a sidewall of the chip component and a sidewall of the dispenser needle;

and filling a gap between the chip component and the substrate with the resin of the resin pool.

Wille, which teaches heating the assembly prior to dispensing (4, 39+), but fails to teach placing a substrate on a pedestal having a built-in heat source to heat the substrate.

Morimoto teaches placing a substrate [3] on a pedestal [7] having a built-in heat source to heat the substrate (abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a pedestal with a heat source built-in because this is a conventional manner in which heat is provided to a substrate. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

Regarding claim 12, while Wille fails to explicitly teach the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin, Wille implicitly teaches this because the resin of figure 1 is outside the gap after deposition, therefore the rate at which the resin pool is formed between the sidewall of the chip component and the sidewall of the dispenser needle due to capillary action is greater than the rate at which the gap between the chip component and the substrate is filled with the resin is inherently met by Wille.

In re claim 13, while Wille fails to teach in the step of filling the gap between the chip component and the substrate with the resin of the resin pool, the dispenser needle is fixed at a position until the gap is filled with the resin constituting the resin pool, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to fix the dispenser until after the gap is filled because this is conventionally known in the art, as evinced by US Patents 6,498,0542; 6,610,559 (figure 1); 6,724,091 (figure 1C); 5,766,982 (figures 1 & 2); 6,391,683; 6,475,828. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

Regarding claim 14, while Wille fails to teach, in forming the resin pool, the distance between the sidewall of the chip component and the sidewall of the dispenser needle is less than about 0.15 mm, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

With respect to claim 15, Wille teaches the chip component is a bare chip (2, 18+).

With respect to claim 16, while Wille fails to teach the circuit module includes a radio frequency circuit, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a radio frequency circuit because radio frequency circuits are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

As to claim 17, Wille teaches the resin is an epoxy resin (2, 54+).

As to claim 18, while Wille fails to teach the sidewall of the dispenser needle is coated with a water repellant material, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to coat the needle with a water repellant because water repellant coated needles are conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

In re claim 19, while Wille fails to teach, in forming the resin pool, the distance between a tip of the dispenser needle and a top surface of the substrate is about 50 um,

Art Unit: 2829

barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

Regarding claim 20, while Wille fails to teach, in forming the resin pool, the distance between a bottom surface of the chip component and a top surface of the substrate is about 40 um, barring a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize this distance through routine experimentation (MPEP 2144.05).

### ***Conclusion***

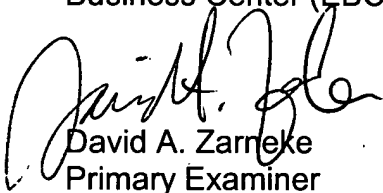
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The art cited but not relied upon teaches the state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-F 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Baumeister can be reached on (571)-272-1712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2829

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David A. Zarneke  
Primary Examiner  
March 17, 2005